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EXAMINER	
ISOM, JOHN W	
ART UNIT	PAPER NUMBER
2447	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/698,211	TRIPATHI, SUNAY	
	Examiner	Art Unit	
	John Isom	2447	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *31 October 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-63* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-63* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *31 October 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *10/07/2004, 06/03/2005, and 04/25/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-63 are pending.

Claim Objections

2. Claims 1-3, 5, 6, 8, 9, 18, 20, 23-26, 28, 30-33, 42, 44, 45, 53, 55-57 and 59-63 are objected to because of the following informalities:

- In claim 1, at page 24 line 7, please amend “a packet” to “[[a]] said packet”.
- In claim 1, at page 24 line 9, please amend “packets” to “said packets”.
- In claim 1, at page 24 lines 9-10, please amend “a predefined rate” to “[[a]] said predefined rate”.
- In claim 1, at page 24 line 11, please amend “a packet” to “[[a]] said packet”.
- In claim 2, at page 24 line 17, please amend “packets” to “said packets”.
- In claim 2, at page 24 line 22, please amend “packets” to “said packets”.
- In claim 3, at page 25 line 1, please amend “packets” to “said packets”.
- In claim 5, at page 25 line 10, please amend “packets” to “said packets”.
- In claim 5, at page 25 line 10, the term “frequently” is indefinite as vague.
- In claim 5, at page 25 line 12, please amend “packets” to “said packets”.
- In claim 5, at page 25 line 12, the term “infrequently” is indefinite as vague.
- In claim 6, at page 25 line 17, please amend “packets” to “said packets”.
- In claim 6, at page 25 line 20, please amend “packets” to “said packets”.
- In claim 8, at page 26 lines 6-7, please amend “a packet” to “[[a]] said packet”.
- In claim 8, at page 26 line 10, please amend “packets” to “said packets”.

- In claim 9, at page 26 lines 15-16, please amend “a packet” to “[[a]] said packet”.
- In claim 9, at page 26 line 23, please amend “packets having a high priority” to “said packets having [[a]] high priority”.
- In claim 18, at page 28 line 19, please amend “packets” to “said packets”.
- In claim 18, at page 28 line 22, please amend “packets” to “said one or more packets”.
- In claim 20, at page 29 line 9, please amend “the set of packets are” to “the set of one or more packets ~~are~~ is”.
- Claim 20 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.
- In claim 23, at page 29 line 24, please amend “the packets” to “the set of one or more packets”.
- In claim 24, at page 30 line 3, please amend “the packets” to “the set of one or more packets”.
- In claim 25, at page 30 line 6, please amend “the packets” to “the set of one or more packets”.
- In claim 26, at page 30 line 12, please amend “the packets” to “the set of one or more packets”.

- In claim 28, at page 30 line 20, please amend “the packets” to “the set of one or more packets”.
- In claim 28, at page 30 line 21, please amend “one or more packets” to “one or more said packets”.
- In claim 28, at page 30 line 23, please amend “one or more packets” to “one or more said packets”.
- In claim 28, at page 30 line 24, please amend “the one or more packets” to “the one or more said packets”.
- In claim 28, at page 31 line 2, please amend “the packets” to “the one or more said packets”.
- In claim 30, at page 31 line 12, please amend “the packets” to “the one or more said packets”.
- In claim 31, at page 31 line 17, please amend “the packets” to “the one or more said packets”.
- In claim 32, at page 31 line 21, please amend “packets” to “the set of one or more packets”.
- In claim 33, at page 32 line 2, please amend “the set of packets” to “the set of one or more packets”.
- In claim 42, at page 33 line 20, please amend “identified by the identifier” to “~~identified by~~ with which the identifier is further associated,”.
- In claim 44, at page 34 line 8, please amend “packets” to “said packets”.
- In claim 44, at page 34 line 10, please amend “packets” to “said packets”.

- In claim 45, at page 34 line 17, please amend “polling mode” to “a polling mode”.
- In claim 53, at page 36 line 18, please amend “one or more packets” to “said one or more packets”.
- In claim 55, at page 37 line 5, please amend “packet” to “said packet”.
- In claim 55, at page 37 line 8, please amend “packets” to “said one or more packets”.
- In claim 56, at page 37 line 13, please amend “packet” to “said packet”.
- In claim 57, at page 38 line 3, please amend “one or more packets” to “said one or more packets”.
- In claim 59, at page 38 line 15, please amend “packet” to “said packet”.
- In claim 59, at page 38 line 18, please amend “packets” to “said one or more packets”.
- In claim 60, at page 38 line 23, please amend “packet” to “said packet”.
- In claim 61, at page 39 line 11, please amend “packet” to “said packet”.
- In claim 61, at page 39 line 14, please amend “packets” to “said packets”.
- In claim 61, at page 39 line 16, please amend “packet” to “said packet”.
- In claim 62, at page 40 line 1, please amend “packet” to “said packet”.
- In claim 62, at page 40 line 4, please amend “packets” to “said packets”.
- In claim 62, at page 40 line 6, please amend “packet” to “said packet”.
- In claim 63, at page 40 line 16, please amend “packet” to “said packet”.
- In claim 63, at page 40 line 18, please amend “packets” to “said packets”.

- In claim 63, at page 40 line 20, please amend "packet" to "said packet".

Appropriate correction is required.

Claim Rejections - 35 USC § 101

3. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

4. Each of claims **57-61** is directed to "[a] computer-readable medium storing thereon computer readable instructions . . . ." Applicant's specification discloses the following:

- "The invention can also be embodied as computer readable code on a computer readable medium." (page 5, lines 18-19).
- "The computer system 1502 includes . . . memory devices including primary storage device 1506 (typically a read only memory, or ROM) and primary storage device 1508 (typically a random access memory, or RAM) . . . . Both the primary storage devices 1506, 1508 may include any suitable computer-readable media." (page 21, lines 18-22; page 22, lines 1-3).
- "A secondary storage medium 1510, which is typically a mass memory device, . . . provides additional data storage capacity. The mass memory device 1510 is a computer-readable medium that may be used to store programs including computer code, data, and the like. Typically, the mass memory device 1510 is a storage medium such as a hard disk which is generally slower than primary storage devices 1506, 1508." (page 22, lines 5-11).

In the present Application, the Examiner construes "computer-readable medium" to be limited to storage type media only, and to exclude transmission type media.

5. Claims **53-56 and 62** are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Applicant's specification discloses that "[t]he embodiments of the invention may be implemented [sic] software, hardware, or a combination of hardware and software" (page 5, lines 17-18). This disclosure allows for the structure of the claimed invention to be achieved in software alone. In such a case, the claims lack the necessary physical articles or objects to constitute a machine or a manufacture within the meaning of 35 U.S.C. 101; they are not a series of steps or acts to be a process; and they are not a combination of chemical compounds to be a composition of matter. As such, they fail to fall within a statutory category. They are, at best, functional descriptive material *per se*.

Double Patenting

6. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

7. Applicant's claim **57** is rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 45 of U.S. Patent No. 6434651 ("the '651 patent"). Although the conflicting claims are not identical, they are not patentably distinct from each other because the subject matter claimed in the instant application is equivalent to that disclosed in and covered by the patent, and the patent and the application are claiming equivalent subject matter, as follows:

(Applicant's claim)	(the '651 patent claim)
57. A computer-readable medium storing thereon computer readable instructions for processing packets in a computer system including an operating system and a network interface card, comprising:	45. A computer readable storage medium storing instructions that, when executed by a computer, cause the computer to perform a method of controlling the generation of interrupts from a communication device, the method comprising:
instructions for polling the network interface card to determine whether one or more packets have been received when the network interface card is in a polling mode; and	. . . operating said communication device in a polling mode . . . , wherein said host computer identifies a transfer of a second packet of information in said polling mode by polling said communication device; . . .

(Applicant's claim)	(the '651 patent claim)
instructions for receiving an interrupt from the network interface card when the network interface card is in an interrupt mode, the interrupt indicating that the network interface card has received one or more packets.	operating a communication device in an interrupt mode . . . , wherein a host computer identifies a transfer of a first packet of information in said interrupt mode by receiving an interrupt generated by said communication device; . . . .

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

9. Claims **1-8, 10-14, 16, 45, 46, 48, 49, 51-55, 57-59 and 61-63** are rejected under 35 U.S.C. 102(b) as being anticipated by Delorme (US Pat. No. 6173343).

With regard to claim **1**, Delorme teaches:

A method of configuring a network interface card (110 in Figure 1), comprising:

instructing the network interface card to operate in a first mode when packets are received by the network interface card at less than a predefined rate (Figure 4; column 4, lines 47-53; column 2, lines 7-11),

the network interface card in the first mode being capable of interrupting a CPU when a packet is received by the network interface card (column 4, lines 35-42); and

instructing the network interface card to operate in a second mode when packets are received by the network interface card at greater than a predefined rate (column 4, lines 54-58), the network interface card in the second mode being disabled from

interrupting the CPU when a packet is received by the network interface card (column 4, lines 38-39).

With regard to claim **2**, Delorme teaches:

A method of processing packets in a computer system (Figure 1) including an operating system (Figure 3; column 4, lines 1-20; column 1, lines 23-30) and a network interface card (110), comprising:

polling the network interface card to determine whether one or more packets have been received when the network interface card is in a polling mode (i.e., in a timed mode, the network interface card 110 is periodically polled and serviced if required; column 2, lines 43-57); and

receiving an interrupt from the network interface card when the network interface card is in an interrupt mode, the interrupt indicating that the network interface card has received one or more packets (column 4, lines 35-42).

With regard to claim **3**, Delorme teaches:

The method as recited in claim 2, further comprising:

obtaining packets from the network interface card and processing the packets obtained from the network interface card (column 3, lines 17-20).

With regard to claim **4**, Delorme teaches:

The method as recited in claim 2, wherein the operating system is configured to instruct the network interface card to operate in the polling mode or the interrupt mode (Figure 4; column 4, lines 14-16 and 35-46).

With regard to claim **5**, Delorme teaches:

The method as recited in claim 2, further comprising:

instructing the network interface card to operate in the polling mode when packets are being received frequently by the network interface card (column 4, lines 54-58); and

instructing the network interface card to operate in the interrupt mode when packets are being received infrequently by the network interface card (column 4, lines 47-53).

With regard to claim **6**, Delorme teaches:

The method as recited in claim 2, further comprising:

instructing the network interface card to operate in the polling mode when a number of packets received per second by the network interface card is greater than a predefined number (column 5, lines 11-20); and

instructing the network interface card to operate in the interrupt mode when the number of packets received per second by the network interface card is less than the predefined number (column 5, lines 18-20).

With regard to claim **7**, Delorme teaches:

The method as recited in claim 2, wherein the computer system has one or more CPUs (100 in Figure 1), and wherein the mode of the network interface card is established in association with one or more of the CPUs (column 4, lines 35-42).

With regard to claim **8**, Delorme teaches:

The method as recited in claim 2, the network interface card when in the interrupt mode being configured to interrupt the operating system when a packet is received by the network interface card over a network (column 4, lines 35-42), the network interface card being unable to interrupt the operating system when in the polling mode (column 4, lines 35-42), thereby enabling the operating system to poll the network interface card to obtain packets from the network interface card when the network interface card is in the polling mode (column 2, lines 43-57 and 49-50).

With regard to claim **10**, Delorme teaches:

The method as recited in claim 2, further comprising:

ascertaining whether the network interface card is in an interrupt mode or a polling mode (i.e., in Figure 4, in the first decision block it is ascertained whether the network adapter card 110 is in interrupt mode or timing mode).

With regard to claim **11**, Delorme teaches:

The method as recited in claim 2, further comprising:

placing the network interface card in the polling mode (i.e., in Figure 4 the last process block on the left is “GO TO TIMER MODE"; column 4, lines 54-58).

With regard to claim **12**, Delorme teaches:

The method as recited in claim 2, further comprising:

placing the network interface card in the interrupt mode (i.e., in Figure 4 the last process block on the right is “GO TO INTERRUPT MODE"; column 4, lines 47-53).

With regard to claim **13**, Delorme teaches:

The method as recited in claim 2, further comprising:

initializing the network interface card such that the network interface card is in the interrupt mode (i.e., adapter 110 is settable so that on receipt of a data frame it sends an interrupt signal to CPU 100; column 4, lines 28-34).

With regard to claim **14**, Delorme teaches:

The method as recited in claim 2, further comprising:

instructing the network interface card to switch from the polling mode to the interrupt mode (see discussion with regard to claim 12 above).

With regard to claim **16**, Delorme teaches:

The method as recited in claim 2, further comprising:

instructing the network interface card to switch from the interrupt mode to the polling mode (see discussion with regard to claim 11 above).

With regard to claim **45**, Delorme teaches:

A computer system, comprising:

an operating system (Figure 3; column 4, lines 1-20; column 1, lines 23-30); and

a network interface card (110 in Figure 1) coupled to the operating system (column 4, lines 1-20), the network interface card being configured to operate in an interrupt mode when in a first state and to operate in polling mode when in a second state, the network interface card when in the interrupt mode being configured to interrupt the operating system when a packet is received by the network interface card over a network (column 4, lines 35-42).

With regard to claim **46**, Delorme teaches:

The computer system as recited in claim 45, the network interface card being unable to interrupt the operating system when in the polling mode, thereby enabling the operating system to poll the network interface card to obtain packets from the network interface card when the network interface card is in the polling mode (see discussion above with regard to claim 8).

With regard to claim **48**, Delorme teaches:

The computer system as recited in claim 45, further comprising:

one or more CPUs (100 in Figure 1; column 3, lines 40-42).

With regard to claim **49**, Delorme teaches:

The computer system as recited in claim 48, wherein the network interface card is mapped to one of the CPUs (i.e., the fact that adapter 110 sends an interrupt signal to CPU 100, implies that adapter 110 is mapped to CPU 100; column 4, lines 28-34).

With regard to claim **51**, Delorme teaches:

The computer system as recited in claim 45, further comprising:

means for instructing the network interface card to switch from the interrupt mode to the polling mode (column 4, lines 54-58); and

means for instructing the network interface card to switch from the polling mode to the interrupt mode (column 4, lines 47-53).

With regard to claim **52**, Delorme teaches:

The computer system as recited in claim 45, further comprising: a driver including a call interface between a kernel of the operating system and the network interface card (i.e., CPU 100 executes an interrupt routine in physical driver software 320 which interfaces directly to the hardware of the adapter card 110 indicated in Figure 3 at 330;

column 4, lines 28-34 and 1-10), the call interface enabling the kernel of the operating system to instruct the network interface card to enter the interrupt mode or the polling mode (column 4, lines 35-42).

With regard to claim **53**, Delorme teaches:

An apparatus for processing packets in a computer system including an operating system (Figure 3; column 4, lines 1-20; column 1, lines 23-30) and a network interface card (110 in Figure 1), comprising:

means for polling the network interface card (physical driver software 320 in Figure 3; column 4, lines 14-16) to determine whether one or more packets have been received when the network interface card is in a polling mode (i.e., in a timed mode, the network interface card 110 is periodically polled and serviced if required; column 2, lines 43-57); and

means for receiving an interrupt from the network interface card when the network interface card is in an interrupt mode, the interrupt indicating that the network interface card has received one or more packets (i.e., CPU 100 receives an interrupt signal from adapter 110 in interrupt mode whenever it receives a data frame; column 4, lines 35-42).

With regard to claim **54**, Delorme teaches:

The apparatus as recited in claim 53, further comprising:

means for instructing the network interface card to switch from the interrupt mode to the polling mode (column 4, lines 53-57); and

means for instructing the network interface card to switch from the polling mode to the interrupt mode (column 4, lines 47-52).

With regard to claim **55**, Delorme teaches:

The apparatus as recited in claim 53, the network interface card when in the interrupt mode being configured to interrupt the operating system when a packet is received by the network interface card over a network (column 4, lines 35-42),

the network interface card being unable to interrupt the operating system when in the polling mode, thereby enabling the operating system to poll the network interface card to obtain packets from the network interface card when the network interface card is in the polling mode (see discussion above with regard to claim 8).

With regard to claim **57**, Delorme teaches:

A computer-readable medium storing thereon computer readable instructions for processing packets (i.e., the physical driver software 320 is a computer program which may be in the form of a computer program product for execution on data processing apparatus having memory 140; Figures 3 and 1; column 5, lines 29-35; column 2, lines 58-61; column 3, lines 43-48) in a computer system including an operating system (Figure 3; column 4, lines 1-20; column 1, lines 23-30) and a network interface card (110 in Figure 1), comprising:

instructions for polling the network interface card to determine whether one or more packets have been received when the network interface card is in a polling mode (i.e., in timed mode, the network interface card 110 is periodically polled and serviced if required; column 2, lines 43-57); and

instructions for receiving an interrupt from the network interface card when the network interface card is in an interrupt mode, the interrupt indicating that the network interface card has received one or more packets (column 4, lines 35-42).

With regard to claim **58**, Delorme teaches:

The computer-readable medium as recited in claim 57, further comprising:

instructions for instructing the network interface card to switch from the interrupt mode to the polling mode (see discussion with regard to claim 11 above); and

instructions for instructing the network interface card to switch from the polling mode to the interrupt mode (see discussion with regard to claim 12 above).

With regard to claim **59**, Delorme teaches:

The computer-readable medium as recited in claim 57,

the network interface card when in the interrupt mode being configured to interrupt the operating system when a packet is received by the network interface card over a network, the network interface card being unable to interrupt the operating system when in the polling mode, thereby enabling the operating system to poll the network interface card to obtain packets from the network interface card when the

network interface card is in the polling mode (see discussion with regard to claim 8 above).

With regard to claim **61**, Delorme teaches:

A computer-readable medium storing thereon computer-readable instructions (i.e., the physical driver software 320 is a computer program which may be in the form of a computer program product for execution on data processing apparatus having memory 140; Figures 3 and 1; column 5, lines 29-35; column 2, lines 58-61; column 3, lines 43-48) for configuring a network interface card (physical driver 320 interfaces to the hardware 330 of the adapter card 110 which is settable by the physical driver software; column 4, lines 1-10 and 28-34; column 5, lines 22-28), comprising:

instructions for instructing the network interface card to operate in a first mode when packets are received by the network interface card at less than a predefined rate (see discussion with regard to claim 1 above),

the network interface card in the first mode being capable of interrupting a CPU when a packet is received by the network interface card (see discussion with regard to claim 1 above); and

instructions for instructing the network interface card to operate in a second mode when packets are received by the network interface card at greater than a predefined rate, the network interface card in the second mode being disabled from interrupting the CPU when a packet is received by the network interface card (see discussion with regard to claim 1 above).

With regard to claim **62**, Delorme teaches:

An apparatus for configuring a network interface card, comprising:

means for instructing the network interface card to operate in a first mode when packets are received by the network interface card at less than a predefined rate (see discussion with regard to claim 1 above),

the network interface card in the first mode being capable of interrupting a CPU when a packet is received by the network interface card (see discussion with regard to claim 1 above);

and means for instructing the network interface card to operate in a second mode when packets are received by the network interface card at greater than a predefined rate, the network interface card in the second mode being disabled from interrupting the CPU when a packet is received by the network interface card (see discussion with regard to claim 1 above).

With regard to claim **63**, Delorme teaches:

An apparatus for configuring a network interface card, comprising:

a processor (100 in Figure 1); and

a memory (140), at least one of the processor and the memory being adapted for:

instructing the network interface card to operate in a first mode when packets are received by the network interface card at less than a predefined rate (i.e., the

communication software which executes on CPU 100 includes physical driver software 320; Figure 3; column 4, lines 1-10; see discussion with regard to claim 1 above),

the network interface card in the first mode being capable of interrupting a CPU when a packet is received by the network interface card (see discussion with regard to claim 1 above); and

instructing the network interface card to operate in a second mode when packets are received by the network interface card at greater than a predefined rate, the network interface card in the second mode being disabled from interrupting the CPU when a packet is received by the network interface card (see discussion with regard to claim 1 above).

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. Claims **9, 47, 56 and 60** are rejected under 35 U.S.C. 103(a) as being unpatentable over Delorme in view of **Vanbuskirk et al.** (US Pat. No. 5301275) (hereinafter referred to as "Vanbuskirk") and further in view of **Gentry '008, Jr., et al.** (US Pat. No. 6467008) (hereinafter referred to as "Gentry '008").

With regard to claim **9**, Delorme teaches: The method as recited in claim 2 (see discussion above), the network interface card when in the interrupt mode being configured to interrupt the operating system when a packet is received by the network

interface card over a network (column 4, lines 35-42), the network interface card being unable to interrupt the operating system when in the polling mode (column 4, lines 35-42) for packets having low priority (i.e., adapter 110 in timed mode does not send interrupts to the CPU, for all packets). Delorme does not teach: being able to interrupt the system when in the polling mode for packets having high priority, further comprising: receiving an interrupt from the network interface card when the network interface card is in the polling mode when the network interface card has received one or more packets having a high priority. However, Vanbuskirk teaches:

being able to interrupt the system . . . for packets having high priority (i.e., in firmware of a data concentrator 28, interrupt types are serviced in a fixed priority of: receive data (highest priority), transmit data, etc.; Figure 2; column 49, lines 26-37), further comprising:

receiving an interrupt from the network interface card . . . when the network interface card has received one or more packets having a high priority (i.e., a UART 78 of data concentrator 28 indicates a sub-type of a received data interrupt that has occurred, *in order to afford efficient and equitable communication between remote devices and a central device*; Figure 4; column 49, lines 38-50; column 3, lines 9-25).

Based on Delorme in view of Vanbuskirk, it would have been obvious to a person having ordinary skill in the art at the time the Applicant's invention was made, to combine the teaching of Vanbuskirk with the subject matter as taught by Delorme, in order to afford efficient and equitable communication between remote devices and a central device.

Delorme in view of Vanbuskirk does not teach: being able to interrupt the system when in the polling mode; and, receiving an interrupt from the network interface card when the network interface card is in the polling mode. However, Gentry '008 teaches: being able to interrupt the system when in the polling mode; and, receiving an interrupt from the network interface card when the network interface card is in the polling mode (i.e., in Figure 4, an interrupt 424 may be issued in a polling-enabled state 402 of a network interface, *so that a polling mode of operation may be combined with interrupt modulation*; column 17, lines 20-24; column 16, lines 57-63; column 2, lines 55-65). Based on Delorme in view of Vanbuskirk and further in view of Gentry '008, it would have been obvious to a person having ordinary skill in the art at the time the Applicant's invention was made, to combine the teaching of Gentry '008 with the subject matter as taught by Delorme in view of Vanbuskirk, so that a polling mode of operation may be combined with interrupt modulation.

With regard to claim **47**, Delorme teaches: The computer system as recited in claim 45 (see discussion above), the network interface card being unable to interrupt the operating system when in the polling mode (column 4, lines 35-42) for packets having low priority (i.e., adapter 110 in timed mode does not send interrupts to the CPU, for all packets). Delorme does not teach: being able to interrupt the system when in the polling mode for packets having high priority. However, Vanbuskirk teaches: being able to interrupt the system . . . for packets having high priority (i.e., in firmware of a data concentrator 28, interrupt types are serviced in a fixed priority of: receive data (highest

priority), transmit data, etc., *in order to afford efficient and equitable communication between remote devices and a central device*; Figure 2; column 49, lines 26-37; column 3, lines 9-25). Based on Delorme in view of Vanbuskirk, it would have been obvious to a person having ordinary skill in the art at the time the Applicant's invention was made, to combine the teaching of Vanbuskirk with the subject matter as taught by Delorme, in order to afford efficient and equitable communication between remote devices and a central device.

Delorme in view of Vanbuskirk does not teach: being able to interrupt the system when in the polling mode. However, Gentry '008 teaches: being able to interrupt the system when in the polling mode (i.e., in Figure 4, an interrupt 424 may be issued in a polling-enabled state 402 of a network interface, *so that a polling mode of operation may be combined with interrupt modulation*; column 17, lines 20-24; column 16, lines 57-63; column 2, lines 55-65). Based on Delorme in view of Vanbuskirk and further in view of Gentry '008, it would have been obvious to a person having ordinary skill in the art at the time the Applicant's invention was made, to combine the teaching of Gentry '008 with the subject matter as taught by Delorme in view of Vanbuskirk, so that a polling mode of operation may be combined with interrupt modulation.

With regard to claim **56**, Delorme teaches: The computer system as recited in claim 53 (see discussion above), the network interface card when in the interrupt mode being configured to interrupt the operating system when a packet is received by the network interface card over a network (column 4, lines 35-42), the network interface

card being unable to interrupt the operating system when in the polling mode (column 4, lines 35-42) for packets having low priority (i.e., adapter 110 in timed mode does not send interrupts to the CPU, for all packets). Delorme does not teach: being able to interrupt the system when in the polling mode for packets having high priority. However, Vanbuskirk teaches: being able to interrupt the system . . . for packets having high priority (i.e., in firmware of a data concentrator 28, interrupt types are serviced in a fixed priority of: receive data (highest priority), transmit data, etc., *in order to afford efficient and equitable communication between remote devices and a central device*; Figure 2; column 49, lines 26-37; column 3, lines 9-25). Based on Delorme in view of Vanbuskirk, it would have been obvious to a person having ordinary skill in the art at the time the Applicant's invention was made, to combine the teaching of Vanbuskirk with the subject matter as taught by Delorme, in order to afford efficient and equitable communication between remote devices and a central device.

Delorme in view of Vanbuskirk does not teach: being able to interrupt the system when in the polling mode. However, Gentry '008 teaches: being able to interrupt the system when in the polling mode (i.e., in Figure 4, an interrupt 424 may be issued in a polling-enabled state 402 of a network interface, *so that a polling mode of operation may be combined with interrupt modulation*; column 17, lines 20-24; column 16, lines 57-63; column 2, lines 55-65). Based on Delorme in view of Vanbuskirk and further in view of Gentry '008, it would have been obvious to a person having ordinary skill in the art at the time the Applicant's invention was made, to combine the teaching of Gentry

'008 with the subject matter as taught by Delorme in view of Vanbuskirk, so that a polling mode of operation may be combined with interrupt modulation.

With regard to claim **60**, Delorme teaches: The computer-readable medium as recited in claim 57 (see discussion above), the network interface card when in the interrupt mode being configured to interrupt the operating system when a packet is received by the network interface card over a network (column 4, lines 35-42), the network interface card being unable to interrupt the operating system when in the polling mode (column 4, lines 35-42) for packets having low priority (i.e., adapter 110 in timed mode does not send interrupts to the CPU, for all packets). Delorme does not teach: being able to interrupt the system when in the polling mode for packets having high priority. However, Vanbuskirk teaches: being able to interrupt the system . . . for packets having high priority (i.e., in firmware of a data concentrator 28, interrupt types are serviced in a fixed priority of: receive data (highest priority), transmit data, etc., *in order to afford efficient and equitable communication between remote devices and a central device*; Figure 2; column 49, lines 26-37; column 3, lines 9-25). Based on Delorme in view of Vanbuskirk, it would have been obvious to a person having ordinary skill in the art at the time the Applicant's invention was made, to combine the teaching of Vanbuskirk with the subject matter as taught by Delorme, in order to afford efficient and equitable communication between remote devices and a central device.

Delorme in view of Vanbuskirk does not teach: being able to interrupt the system when in the polling mode. However, Gentry '008 teaches: being able to interrupt the

system when in the polling mode (i.e., in Figure 4, an interrupt 424 may be issued in a polling-enabled state 402 of a network interface, *so that a polling mode of operation may be combined with interrupt modulation*; column 17, lines 20-24; column 16, lines 57-63; column 2, lines 55-65). Based on Delorme in view of Vanbuskirk and further in view of Gentry '008, it would have been obvious to a person having ordinary skill in the art at the time the Applicant's invention was made, to combine the teaching of Gentry '008 with the subject matter as taught by Delorme in view of Vanbuskirk, so that a polling mode of operation may be combined with interrupt modulation.

12. Claim **15** is rejected under 35 U.S.C. 103(a) as being unpatentable over Delorme in view of **IIIg** (US Pub. No. 20030135723).

With regard to claim **15**, Delorme teaches the claimed subject matter as discussed above except: instructing the network interface card to switch from the polling mode to the interrupt mode for a specified period of time. However, IIIg teaches: instructing the network interface card to switch from the polling mode to the interrupt mode for a specified period of time (i.e., interrupts are enabled in a fixed time window, *so that upon occurrence of an interrupt, normal program execution is not interrupted*; [0011]). Based on Delorme in view of IIIg, it would have been obvious to a person having ordinary skill in the art at the time the Applicant's invention was made, to combine the teaching of IIIg with the subject matter as taught by Delorme, so that upon occurrence of an interrupt, normal program execution is not interrupted.

13. Claim **17** is rejected under 35 U.S.C. 103(a) as being unpatentable over Delorme in view of Gentry '008.

With regard to claim **17**, Delorme teaches the claimed subject matter as discussed above except: instructing the network interface card to switch from the interrupt mode to the polling mode for a specified period of time. However, Gentry '008 teaches: instructing the network interface card to switch from the interrupt mode to the polling mode for a specified period of time (i.e., in Figure 4, a polling-enabled state 402 is entered from an interrupt enabled state 404, for a period of time specified by a time counter; if the time counter expires or reaches its final value before a polling operation can be completed, the interrupt enabled state 404 is re-entered *so that, if polling operations are stalled or blocked, the host processor will attend to received packets in a timely manner*; column 16, lines 64-66; column 17, lines 1-11; column 14, lines 17-32). Based on Delorme in view of Gentry '008, it would have been obvious to a person having ordinary skill in the art at the time the Applicant's invention was made, to combine the teaching of Gentry '008 with the subject matter as taught by Delorme, so that, if polling operations are stalled or blocked, the host processor will attend to received packets in a timely manner.

14. Claims **18-21, 23-32, 34, 36-44 and 50** are rejected under 35 U.S.C. 103(a) as being unpatentable over Delorme in view of **Gentry, Jr.** (US Pat. No. 6356951) (hereinafter referred to as "Gentry '951").

With regard to claim **18**, Delorme teaches: The method as recited in claim 2 (see discussion above), wherein the computer system further includes a CPU (100 in Figure 1; column 3 lines 40-42), . . . the network interface card having an associated buffer (i.e., the network adapter has a buffer from which incoming frames are transferred to main storage of the computer; column 2, lines 26-42 and 27-28; column 3, lines 21-27). Delorme does not teach: the CPU having an associated queue, . . . the method further comprising: if it is determined that one or more packets have been received by the network interface card, transferring the one or more packets from the buffer associated with the network interface card to the queue associated with the CPU and processing each of the packets in the queue associated with the CPU. However, Gentry '951 teaches:

the CPU having an associated queue (column 50, lines 3-20), . . . the method further comprising:

if it is determined that one or more packets have been received by the network interface card, transferring the one or more packets from the buffer associated with the network interface card to the queue associated with the CPU and processing each of the packets in the queue associated with the CPU (i.e., upon receiving an interrupt from a NIC 100 for delivery of a new packet, the host computer's operating system interrupt handler invokes a device driver for NIC 100 to transfer the newly received packet from a descriptor ring to a queue for the specified processor, *in order to effect a load distribution scheme*; column 49, lines 52-67; column 50, lines 3-32; column 51, lines 53-67).

Based on Delorme in view of Gentry '951, it would have been obvious to a person having ordinary skill in the art at the time the Applicant's invention was made, to combine the teaching of Gentry '951 with the subject matter as taught by Delorme, in order to effect a load distribution scheme.

With regard to claim **19**, Delorme teaches: The method as recited in claim 2 (see discussion above), wherein the computer system further includes a CPU (100 in Figure 1; column 3 lines 40-42), . . . the network interface card having an associated buffer (i.e., the network adapter has a buffer from which incoming frames are transferred to main storage of the computer; column 2, lines 26-42 and 27-28; column 3, lines 21-27). Delorme does not teach: the CPU having an associated queue, . . . the method further comprising: when an interrupt is received from the network interface card, transferring a set of one or more packets from the buffer associated with the network interface card to the queue associated with the CPU. However, Gentry '951 teaches:

the CPU having an associated queue (column 50, lines 3-20), . . . the method further comprising:

when an interrupt is received from the network interface card, transferring a set of one or more packets from the buffer associated with the network interface card to the queue associated with the CPU (i.e., upon receiving an interrupt from a NIC 100 for delivery of a new packet, the host computer's operating system interrupt handler invokes a device driver for NIC 100 to transfer the newly received packet from a descriptor ring to a queue for the specified processor, *in order to effect a load*

distribution scheme; column 49, lines 52-67; column 50, lines 3-32; column 51, lines 53-67).

Based on Delorme in view of Gentry '951, it would have been obvious to a person having ordinary skill in the art at the time the Applicant's invention was made, to combine the teaching of Gentry '951 with the subject matter as taught by Delorme, in order to effect a load distribution scheme.

With regard to claim **20**, Delorme in view of Gentry '951 teaches: The method as recited in claim 19 (see discussion above). Gentry '951 further teaches: wherein the set of packets are transferred simultaneously (i.e., upon being invoked, the device driver may transfer information for multiple packets from the descriptor ring to the queue; column 50, lines 3-20; column 6, lines 51-56). Therefore, the limitations of claim 20 are rejected in the analysis of claim 19, and the claim is rejected on that basis.

With regard to claim **21**, Delorme in view of Gentry '951 teaches: The method as recited in claim 19 (see discussion above). Delorme further teaches: instructing the network interface card to switch from the polling mode to the interrupt mode when no packets are in the queue associated with the CPU or the buffer associated with the network interface card (i.e., if in more than 10 consecutive timer periods less than 1 frame is handled then the driver switches back to interrupt mode; column 5, lines 11-20).

With regard to claim **23**, Delorme in view of Gentry '951 teaches the claimed subject matter as discussed above with regard to claim 19. Gentry '951 further teaches: processing each of the packets in the queue (718 in Figure 7; column 50, lines 60-65). Therefore, the limitations of claim 23 are rejected in the analysis of claim 19, and the claim is rejected on that basis.

With regard to claim **24**, Delorme in view of Gentry '951 teaches the claimed subject matter as discussed above with regard to claim 23. Delorme further teaches: wherein each of the packets in the queue is inbound or outbound (i.e., packets flow between the computer and the network in both directions; column 3, lines 12-16).

With regard to claim **25**, Delorme in view of Gentry '951 teaches the claimed subject matter as discussed above with regard to claim 23. Delorme further teaches: wherein each of the packets in the queue corresponds to one or more network connections (i.e., the packets flow between the computer and the network to which it is connected; column 3, lines 12-16).

With regard to claim **26**, Delorme in view of Gentry '951 teaches the claimed subject matter as discussed above with regard to claim 23. Delorme further teaches: instructing the network interface card to switch from the interrupt mode to the polling mode (i.e., in Figure 4 the last process block on the left is "GO TO TIMER MODE"; column 4, lines 54-58). Gentry '951 further teaches: to switch . . . to the polling mode

prior to processing each of the packets in the queue (i.e., the host computer may poll the NIC to determine when a packet has been received and/or transferred; column 68, lines 7-25. Because a packet is received and/or transferred prior to processing, the host computer must necessarily poll the NIC before processing. This implies to switch to the polling mode prior to processing each of the packets in the queue). Therefore, the limitations of claim 26 are rejected in the analysis of claim 23, and the claim is rejected on that basis.

With regard to claim **27**, Delorme in view of Gentry '951 teaches the claimed subject matter as discussed above with regard to claim 23. Delorme further teaches: instructing the network interface card to switch from the interrupt mode to the polling mode (i.e., in Figure 4 the last process block on the left is "GO TO TIMER MODE"; column 4, lines 54-58).

With regard to claim **28**, Delorme in view of Gentry '951 teaches the claimed subject matter as discussed above with regard to claim 27. Gentry '951 further teaches:

after processing each of the packets in the queue, polling the network interface card to determine if one or more packets have been received by the network interface card in the buffer associated therewith (i.e., the host computer may poll the NIC to determine when a packet has been received and/or transferred; column 68, lines 7-25); and

if one or more packets have been received by the network interface card, transferring the one or more packets from the buffer associated with the network interface card to the queue associated with the CPU (i.e., the device driver for the NIC transfers the received packets from the descriptor ring to the queue for the specified processor; column 50, lines 3-32). Therefore, the limitations of claim 28 are rejected in the analysis of claims 23 and 27, and the claim is rejected on that basis.

With regard to claim **29**, Delorme in view of Gentry '951 teaches the claimed subject matter as discussed above with regard to claim 28. Delorme further teaches: if no more packets have been received by the network interface card, instructing the network interface card to switch from the polling mode to the interrupt mode (i.e., if in more than 10 consecutive timer periods less than 1 frame is handled then the driver switches back to interrupt mode; column 5, lines 11-20).

With regard to claim **30**, Delorme in view of Gentry '951 teaches the claimed subject matter as discussed above with regard to claim 27. Delorme further teaches: instructing the network interface card to switch from the polling mode to the interrupt mode after processing each of the packets in the queue (i.e., if in more than 10 consecutive timer periods less than 1 frame is handled then the driver switches back to interrupt mode; column 5, lines 11-20).

With regard to claim **31**, Delorme in view of Gentry '951 teaches the claimed subject matter as discussed above with regard to claim 23. Delorme further teaches: instructing the network interface card to switch from the polling mode to the interrupt mode after processing each of the packets in the queue (i.e., if in more than 10 consecutive timer periods less than 1 frame is handled then the driver switches back to interrupt mode; column 5, lines 11-20).

With regard to claim **32**, Delorme in view of Gentry '951 teaches the claimed subject matter as discussed above with regard to claim 19. Gentry '951 further teaches: instantiating a worker thread for processing packets in the queue associated with the CPU (718 in Figure 7; column 50, lines 43-52 and 60-65). Therefore, the limitations of claim 32 are rejected in the analysis of claim(s) 19, and the claim is rejected on that basis.

With regard to claim **34**, Delorme in view of Gentry '951 teaches the claimed subject matter as discussed above with regard to claim 32. Gentry '951 further teaches: wherein the worker thread is responsible for instructing (i.e., a thread is a process that may execute in a normal mode, or at a high priority, or at a relatively low interrupt level; column 50, lines 33-42). Delorme further teaches: instructing the network interface card to switch from polling mode to interrupt mode when no packets are in the queue associated with the CPU or the buffer associated with the network interface card (i.e., if in more than 10 consecutive timer periods less than 1 frame is handled then the driver

switches back to interrupt mode; column 5, lines 11-20. Because the driver is a process, it may comprise a thread). Therefore, the limitations of claim 34 are rejected in the analysis of claim(s) 32, and the claim is rejected on that basis.

With regard to claim **36**, Delorme teaches the claimed subject matter as discussed above except: assigning an identifier to map one of a set of one or more CPUs in the computer system to one of a set of one or more network interface cards. However, Gentry '951 teaches: assigning an identifier to map one of a set of one or more CPUs in the computer system to one of a set of one or more network interface cards (i.e., an identifier specifies a number of a processor to process a packet received by a NIC 100, based on the packet's flow key generated from source and destination identifiers retrieved from the packet's headers, *in order to ensure the correct ordering of packets for an entire connection*; Figures 1 and 7; column 48, lines 64-67; column 49, lines 1-3; column 48, lines 40-50). Based on Delorme in view of Gentry '951, it would have been obvious to a person having ordinary skill in the art at the time the Applicant's invention was made, to combine the teaching of Gentry '951 with the subject matter as taught by Delorme, in order to ensure the correct ordering of packets for an entire connection.

With regard to claim **37**, Delorme in view of Gentry '951 teaches the claimed subject matter as discussed above with regard to claim 36. Delorme further teaches: instructing the network interface card . . . to enter the polling mode (column 4, lines 54-

58). Gentry '951 further teaches: the network interface card identified by the identifier (column 48, lines 64-67; column 49, lines 1-3). Therefore, the limitations of claim 37 are rejected in the analysis of claim(s) 36, and the claim is rejected on that basis.

With regard to claim **38**, Delorme in view of Gentry '951 teaches the claimed subject matter as discussed above with regard to claim 36. Delorme further teaches: instructing the network interface card . . . to enter the interrupt mode (column 4, lines 47-53). Gentry '951 further teaches: the network interface card identified by the identifier (column 48, lines 64-67; column 49, lines 1-3). Therefore, the limitations of claim 38 are rejected in the analysis of claim(s) 36, and the claim is rejected on that basis.

With regard to claim **39**, Delorme in view of Gentry '951 teaches the claimed subject matter as discussed above with regard to claim 36. Gentry '951 further teaches: wherein the interrupt includes the identifier (i.e., handling of an interrupt generated when a new packet is stored, may include retrieval and manipulation of information including the processor number; column 50, lines 21-32; column 49, lines 43-51). Therefore, the limitations of claim 39 are rejected in the analysis of claim(s) 36, and the claim is rejected on that basis.

With regard to claim **40**, Delorme in view of Gentry '951 teaches the claimed subject matter as discussed above with regard to claim 36. Gentry '951 further teaches:

wherein the identifier is further associated with a queue associated with the CPU (column 50, lines 3-20) and a buffer associated with the network interface card (i.e., a data structure stores the number of the processor that will process the packet received by NIC 100; column 49, lines 43-61; column 50, lines 21-32). Therefore, the limitations of claim 40 are rejected in the analysis of claim(s) 36, and the claim is rejected on that basis.

With regard to claim **41**, Delorme in view of Gentry '951 teaches the claimed subject matter as discussed above with regard to claim 40. Gentry '951 further teaches: wherein the interrupt includes the identifier (i.e., handling of an interrupt generated when a new packet is stored, may include retrieval and manipulation of information including the processor number; column 50, lines 21-32; column 49, lines 43-51). Therefore, the limitations of claim 41 are rejected in the analysis of claim(s) 40, and the claim is rejected on that basis.

With regard to claim **42**, Delorme in view of Gentry '951 teaches the claimed subject matter as discussed above with regard to claim 40. Delorme further teaches: instructing the network interface card . . . to switch from the polling mode to the interrupt mode (i.e., in Figure 4 the last process block on the right is "GO TO INTERRUPT MODE"; column 4, lines 47-53). Gentry '951 further teaches: the network interface card identified by the identifier (i.e., the number of the processor that will process the packet received by NIC 100, is stored in a data structure; column 49, lines 43-61; column 50,

lines 21-32). Therefore, the limitations of claim 42 are rejected in the analysis of claim(s) 40, and the claim is rejected on that basis.

With regard to claim **43**, Delorme in view of Gentry '951 teaches the claimed subject matter as discussed above with regard to claim 40. Delorme further teaches: instructing the network interface card . . . to switch from the interrupt mode to the polling mode (i.e., in Figure 4 the last process block on the left is "GO TO TIMER MODE"; column 4, lines 54-58). Gentry '951 further teaches: the network interface card identified by the identifier (i.e., the number of the processor that will process the packet received by NIC 100, is stored in a data structure; column 49, lines 43-61; column 50, lines 21-32). Therefore, the limitations of claim 43 are rejected in the analysis of claim(s) 40, and the claim is rejected on that basis.

With regard to claim **44**, Delorme teaches: The method as recited in claim 2 (see discussion above). Delorme further teaches: instructing the network interface card to operate in the polling mode (i.e., in Figure 4 the last process block on the left is "GO TO TIMER MODE"; column 4, lines 54-58) . . . ; and instructing the network interface card to operate in the interrupt mode (i.e., in Figure 4 the last process block on the right is "GO TO INTERRUPT MODE"; column 4, lines 47-53). Delorme does not teach: [instructing the network interface card to operate in the polling mode] when a network packet that is received or to be transmitted is already being processed and one or more

packets are queued; and [instructing the network interface card to operate in the interrupt mode] when there are no queued packets. However, Gentry '951 teaches:

[instructing the network interface card to operate in the polling mode] when a network packet that is received or to be transmitted is already being processed and one or more packets are queued (i.e., received packets are transferred to a queue for a specified processor (714 in Figure 7; column 50, lines 3-32), the processor is alerted (716; column 50, lines 33-42) and the packet is processed (718; column 50, lines 60-65). The NIC may be polled to determine when a packet has been transferred for processing (column 68, lines 7-25)); and

[instructing the network interface card to operate in the interrupt mode] when there are no queued packets (i.e., a thread responsible for processing an incoming packet may block itself when it has no packets to process, and awaken when there are packets queued by the NIC's device driver upon receipt by the host computer of an interrupt from NIC 100, *in order to effect a load distribution scheme* (column 50, lines 33-52 and 60-65; column 49, lines 62-67; column 50, lines 1-20). Because the interrupt may be issued by NIC 100 when there are no queued packets, NIC 100 may be instructed to operate in the interrupt mode when there are no queued packets).

Based on Delorme in view of Gentry '951, it would have been obvious to a person having ordinary skill in the art at the time the Applicant's invention was made, to combine the teaching of Gentry '951 with the subject matter as taught by Delorme, in order to effect a load distribution scheme.

With regard to claim **50**, Delorme teaches the claimed subject matter as discussed above except: wherein the network interface card is further mapped to a queue associated with the one of the CPUs, wherein the queue is adapted for storing inbound and outbound packets. However, Gentry '951 teaches: wherein the network interface card is further mapped to a queue associated with the one of the CPUs (column 50, lines 3-20), wherein the queue is adapted for storing inbound and outbound packets (packets received from a network may be placed in a queue to await transfer to a host computer, *so that, while awaiting transfer, multiple related packets may be identified to the host computer*; column 6, lines 51-56). Based on Delorme in view of Gentry '951, it would have been obvious to a person having ordinary skill in the art at the time the Applicant's invention was made, to combine the teaching of Gentry '951 with the subject matter as taught by Delorme, so that, while awaiting transfer, multiple related packets may be identified to the host computer.

15. Claims **22 and 35** are rejected under 35 U.S.C. 103(a) as being unpatentable over Delorme in view of Gentry '951, and further in view of Gentry '008.

With regard to claim **22**, Delorme in view of Gentry '951 teaches the claimed subject matter as discussed above except: instructing the network interface card to switch from the interrupt mode to the polling mode when the interrupt is received from the network interface card. However, Gentry '008 teaches: instructing the network interface card to switch from the interrupt mode to the polling mode when the interrupt is received from the network interface card (i.e., a process may switch from an interrupt

mode 702 to a polling mode 706 if there are too many interrupts in a given time period 704, *in order to be more efficient*; Figure 7; column 21, lines 22-61 and 38-52). Based on Delorme in view of Gentry '951 and further in view of Gentry '008, it would have been obvious to a person having ordinary skill in the art at the time the Applicant's invention was made, to combine the teaching of Gentry '008 with the subject matter as taught by Delorme in view of Gentry '951, in order to be more efficient.

With regard to claim **35**, Delorme in view of Gentry '951 teaches the claimed subject matter as discussed above with regard to claim 32. Gentry '951 further teaches: wherein the worker thread is responsible for instructing (i.e., a thread is a process that may execute in a normal mode, or at a high priority, or at a relatively low interrupt level; column 50, lines 33-42). Delorme in view of Gentry '951 does not teach: instructing the network interface card to switch from the interrupt mode to the polling mode after an interrupt is received from the network interface card. However, Gentry '008 teaches: instructing the network interface card to switch from the interrupt mode to the polling mode after an interrupt is received from the network interface card (i.e., a process may switch from an interrupt mode 702 to a polling mode 706 if there are too many interrupts in a given time period 704, *in order to be more efficient*; Figure 7; column 21, lines 22-61 and 38-52). Based on Delorme in view of Gentry '951 and further in view of Gentry '008, it would have been obvious to a person having ordinary skill in the art at the time the Applicant's invention was made, to combine the teaching of Gentry '008 with the subject matter as taught by Delorme in view of Gentry '951, in order to be more efficient.

16. Claim **33** is rejected under 35 U.S.C. 103(a) as being unpatentable over Delorme in view of Gentry '951, and further in view of **Chopra et al.** (US Pat. No. 6167423) (hereinafter referred to as "Chopra").

With regard to claim **33**, Delorme in view of Gentry '951 teaches the claimed subject matter as discussed above with regard to claim 32. Gentry '951 further teaches: transferring the set of packets from the buffer associated with the network interface card to the queue associated with the CPU (i.e., a given network interface device can begin receiving a packet across a corresponding network, and storing data from the packet into buffers queued by the managing processor; column 1, lines 47-59; column 2, lines 63-67). Delorme in view of Gentry '951 does not teach: wherein the worker thread or a second worker thread is responsible for transferring the set of packets. However, Chopra teaches: wherein the worker thread or a second worker thread is responsible for transferring the set of packets (i.e., a worker thread delivers a message taken from an in-buffer, to a message queue, *in order to efficiently utilize worker threads*; 201 and 204 in Figure 7; column 11, lines 33-43). Based on Delorme in view of Gentry '951 and further in view of Chopra, it would have been obvious to a person having ordinary skill in the art at the time the Applicant's invention was made, to combine the teaching of Chopra with the subject matter as taught by Delorme in view of Gentry '951, in order to efficiently utilize worker threads.

Conclusion

17. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Aikin et al. (US Pub. No. 20020087710) teaches packets processed by a worker thread, in order to increase network efficiency ([0106]).
- Chintalapati et al. (US Pub. No. 20020156897) teaches that if a network connection is broken by a client or network, a worker thread may terminate the connection, in order to provide an improved mechanism for servicing connections ([0037], [0023]).

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to John Isom whose telephone number is (571)270-7203. The examiner can normally be reached on Monday through Friday, 9:30 a.m. to 6:00 p.m. ET.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James Hwang can be reached on (571)272-4036. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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/J. I./
Examiner, Art Unit 2447
2/11/2009

/Joon H. Hwang/
Supervisory Patent Examiner, Art Unit 2447